

REMARKS

Claims 1-9, 11-18, 21-24 remain in this application. Claim 1 was amended, Claims 10, 19 and 20 were cancelled and Claims 23-25 were added. Reconsideration in light of the amendments and remarks made herein is respectfully requested.

“A challenge in developing low temperature (less than about 650°C) hydrogen generation systems which reform hydrogen rich fuels such as light hydrocarbons in the C1-04 range and heavy hydrocarbons such as gasoline, jet fuel and diesel, is that carbon formed as a by-product of mechanisms such as the thermal cracking of the fuels is less prone to be removed by carbon removal mechanisms such as gasification” (Specification, para. 0012). “The net result is carbon accumulation in the reactor, commonly known as coking, and has a serious effect on lifetime and reaction efficiencies.” Id. “Operation at low temperatures (<650°C) therefore necessitates the incorporation of techniques that prevent or minimizes carbon formation in the first place.” Id.

Prior art solutions to reduce coking include steam/carbon feed ratios that are greater than stoichiometric ratios, method of contacting and mixing the hydrocarbon and steam feed, minimizing empty reactor volume, and employing operating temperatures that are greater than 750°C to favor gasification.

The present invention is directed to a method for preparing a hydrogen generation reactor chamber to reduce coking by applying a cold spray of an alkaline oxide, doped with alkali or alkaline earth metals mixed with metal (gas-fill mixture), to at least one surface within the chamber. “The term ‘cold spray’ comes from the fact that the temperature at which the spray is occurring is lower than the melting point of the material” (Specification, para. 0037). The metal is mixed with the alkaline oxide to provide ductility to the gas-fill mixture. Id.

The Office Action rejected claims 1-9, 11-18, 21-22 under 35 U.S.C. §112 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicants amended claim 1 to its original form and deleted the phrase subject to the § 112 rejection. Applicant respectfully request that the rejection under 35 U.S.C. § 112 be withdrawn.

In its original form, claim 1 was rejected under 35 U.S.C. § 103(a) as being obvious over *Foster et al.* (U.S. Pat. No. 4,297,150) in view of *Subramanian et al.* (U.S. Pat. No. 6,444,259) (Office Action of 06/18/2007, page 5).

Applicants respectfully traverse.

It should be noted that the burden of establishing a *prima facie* case of obviousness lies with the Patent Office. *In re Fine*, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988) (stating: “The PTO has the burden under section 103 to establish a *prima facie* case of obviousness”). To establish a *prima facie* case of obviousness, (1) there must be some suggestion or motivation (either in the references themselves or in the knowledge generally available to one of ordinary skill in the art) to combine the reference teachings; (2) there must be a reasonable expectation of success; and (3) the prior art reference must teach or suggest all the claim limitations. See *MPEP* §§ 2142-43.

Foster et al. is directed to a two-step process of “first pre-oxidizing the surface and subsequently depositing a metal oxide layer thereon by thermal decomposition of a volatile metal compound” (col. 2, lines 5-8).

Foster et al. fails to disclose, teach or suggest that a mixture of metal and an alkaline oxide is applied to the surface. Rather, as the Office Action of 06/18/2007 noted, *Foster et al.* discloses a process for forming a protective metal oxide film on metal by depositing a metal oxide on a pre-oxidized surface (Office Action of 06/18/2007, page 5). *Foster et al.* also fails to disclose, teach or suggest that the alkaline oxide is doped with alkali or alkaline earth metal. Furthermore, *Foster et al.* also fails to disclose, teach or suggest that the protective metal oxide film is applied to the inner surface of a hydrogen generation reactor chamber. Unless a prior art reference is directed to chambers for hydrogen generation reactions, the inner surface of the chamber will be exposed to different chemical reactions having different effects on the inner surface of the chamber.

We have already demonstrated the inadequacies of teaching the present invention in *Foster et al.* and under 35 U.S.C. § 103, it would be incumbent upon the teaching of *Subramanian et al.* to provide a teaching reference for supplementing the deficiencies of *Foster et al.*.

Subramanian et al. fails to supplement the deficiencies of *Foster et al.*. Hence, independent claim 1 is nonobvious over the combined prior art references.

Dependent Claims 2-9, 11-18, 21-22

Claims 2-9, 11-18, 21-22 depend from claim 1. Thus, these claims are patentable for the same reasons advanced with respect to claim 1.

Claims 23-25

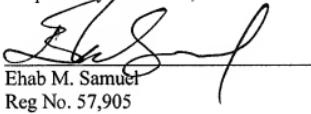
Independent claims 23-25 are patentable for the same reasons advanced above with respect to claim 1.

Applicants respectfully submit that all the claims remaining in the application are now in condition for allowance, and respectfully request that the application be passed to issue. Should any residual matters left to be resolved, the Examiner is invited to contact the undersigned agent at 714.708.6682 (office) at her convenience.

The Commissioner is hereby authorized to charge any required fee in connection with the submission of this paper, now or in the future, or credit any overpayment to Account No.: 50-2638. Please ensure that Attorney Docket Number 70279-011200 is referred to when charging any payments or credits for this case.

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Respectfully submitted,



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